

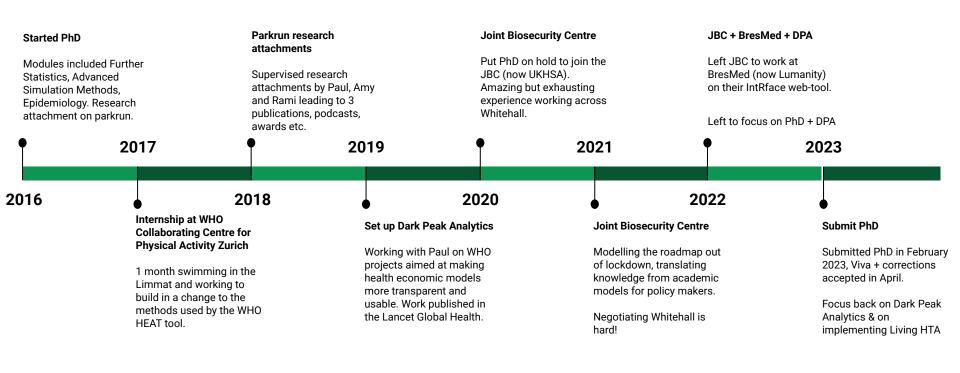
# My journey

Alan/Liddy/Petra (They weren't this old ... when I started)

Me (I don't smoke a pipe)



## How to make submitting a PhD as painful as possible



### 2017 - Internship at WHO

Working on incrementally improving the validity of an existing health economic modelling tool. The WHO's Health Economic Assessment Tool for Walking and Cycling.

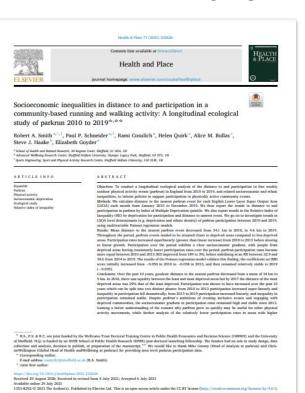








#### 2018 - Parkrun research attachments

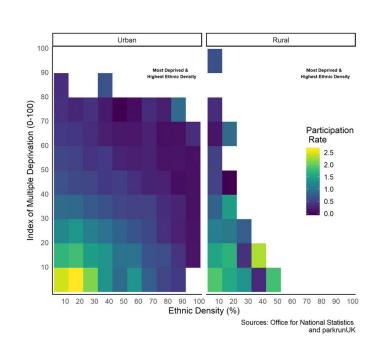


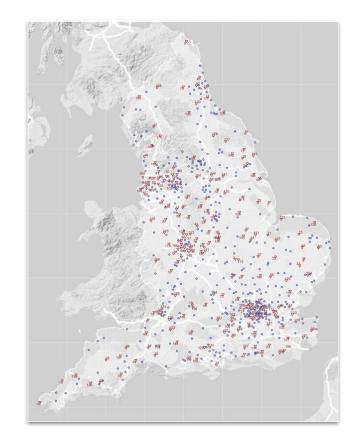




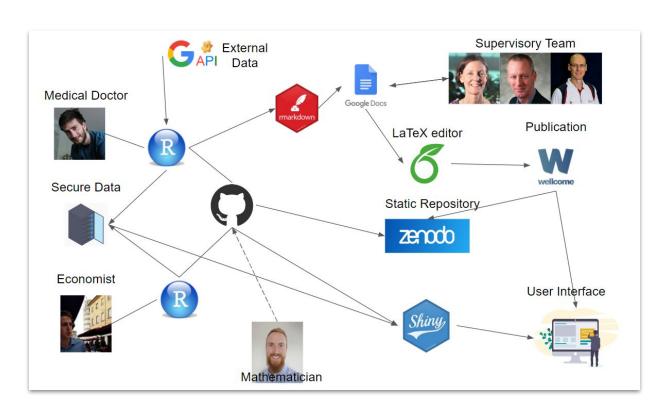


### 2018 - Parkrun research attachments



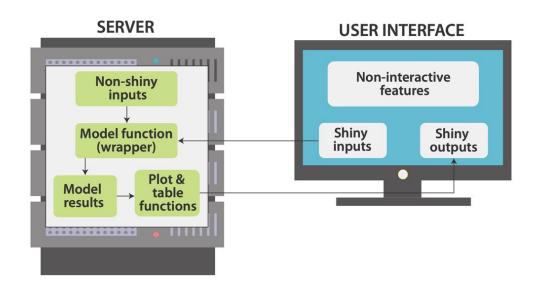


#### 2018 - Parkrun research attachments



# 2019 - Making Health Economic Models Shiny

#### **ShinyApp function**

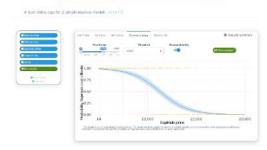




### 2019 - Making Health Economic Models Shiny



#### https://shiny.york.ac.uk/dceasimple/



https://darkpeakanalytics.shinyapps.io/sadm-mk2/



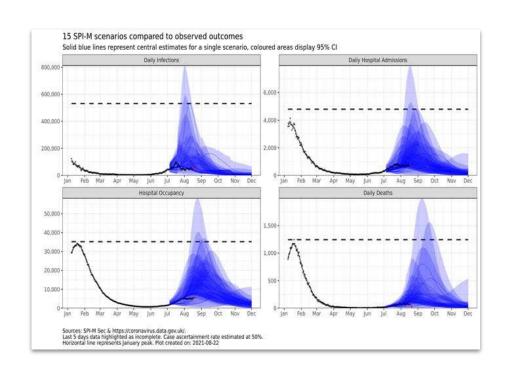
#### https://darkpeakanalytics.shinyapps.io/living HTA demo/

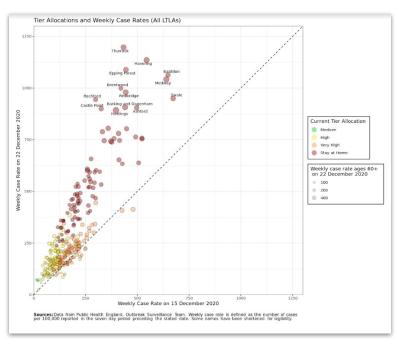




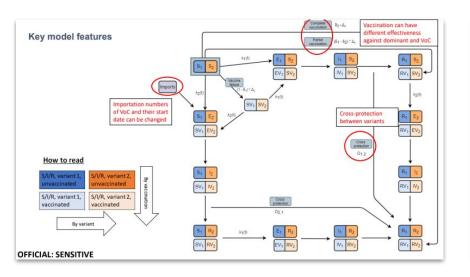
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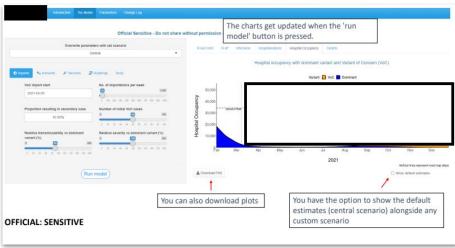
### 2020 - Joint Biosecurity Centre





### 2021 - Joint Biosecurity Centre





### 2022 - Joint Biosecurity Centre

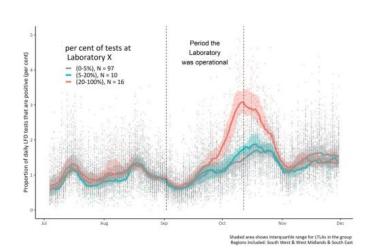
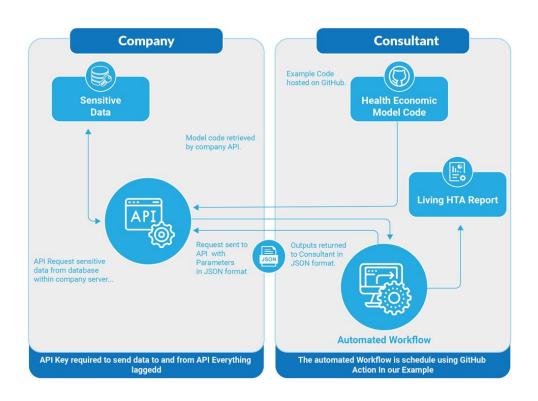


Figure 2: Daily LFD positivity by LTLA from June to December 2021; stratified by proportion of tests sent to the laboratory during 2 September – 21. October in the South West, West Midlands and the South East. The median and inter-quartile-range of 7 day rolling mean LFD positivity is displayed by level of exposure by lines and swathes.

	parpataty.  It is made available under a CC-BY-NO 4.0 international license.
	emiological impact of a large number of incorrect negative SARS-CoV-2 test results in South England during September and October 2021
	some, L. <sup>1</sup> , Herr, D. <sup>1</sup> , Bryant, R. <sup>1</sup> , Smith, R. <sup>1</sup> , Loman, L. <sup>1</sup> , Harris, I. <sup>1</sup> , Youhan, U. <sup>1</sup> , Dzene, E. <sup>1</sup> , pantelis, P. <sup>1</sup> , Long, H. <sup>1</sup> , Laurence, T. <sup>1</sup> , Riley, S. <sup>2</sup> , Cumming, F. <sup>1</sup>
	Advanced Analytics Team. Data, Analytics and Surveillance. UKHSA Director General. Data, Analytics and Surveillance. UKHSA
Unite	rd Kingdom Health Security Agency, November 2022
Abst	ract
until labor numi repo	ground in Figland, free testing for CXVID.19 was vieldly available from early in the pandemic April 2021. Sased on paperent differences in the rare of politice PKI tests at a single atony compared to the rest of the laboratory reterent, we hypothesized that a substantial lever of UR PKI test processed during September and October 2021 may have been incorrectly retal as regardine, compared with the rest of the laboratory network. We investigate the ministigat lampact of this incident.
Octo popu	nods: We estimate the additional number of COVID-19 cases that would have been reported had ensembly of the laboratory test procedure not dropped for the period 2 September to 12 period 2. September to 12 period 12 september 12 lations, we estimate the number of additional infections, cases, hospitalisations and deaths could have occurred as a result of increased artemnission due to the misclassification of tests.
and, expe arou estim infec infec	Its We estimate that around #3,000 tests may have been incorrectly classified during this period as direct result of his nicident, the most affected areas in the Suchi West could he rienced between 6,000 and \$4,000 additional reportable cases, with a central estimate of ad \$4,000 additional reportable cases. Using modelled relationships between key variables, we sate that this central estimate could have transitated to approximately \$5,000 additional tions, which means that each incorrect register test filely left out over two additional tions, in those same geographical areas, our results also suggest an increased number of sisons and deaths.
	<b>lusion</b> The incident is likely to have had a measurable impact on cases and infections in the ted areas in the South West of England.
	oords D-19, Test & Trace, Epidemiology, Public Health
NOTE	This preprint reports new research that has not been certified by peer review and should not be used to guide clinical practice.

Hounsome, L., Herr, D., Bryant, R., **Smith, R.**, ... Cumming, F. 2022. Epidemiological impact of a large number of incorrect negative SARS-CoV-2 test results in South West England during September and October 2021. *medRxiv* (Submitted to The Lancet), pp.2022-11.

### 2022 - BresMed + Dark Peak Analytics



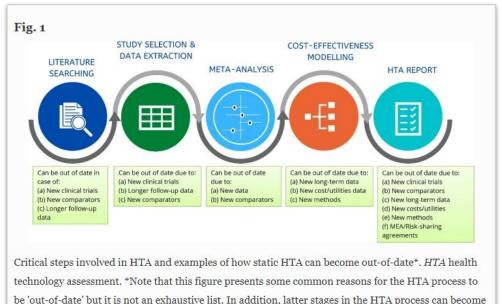


### 2022 - BresMed + Dark Peak Analytics





### 2022 - BresMed + Dark Peak Analytics



be 'out-of-date' but it is not an exhaustive list. In addition, latter stages in the HTA process can become out-of-date for all the reasons in the earlier stages (as the reasons for being out-of-date are cumulative, i.e. they 'build up' from left to right)



#### 2023 - Submit PhD

"Yes, there were times, I'm sure you knew When I bit off more than I could chew But through it all, when there was doubt I ate it up and spit it out I faced it all, and I stood tall And did it my way"



# How to make submitting a PhD as painful as possible ... but do a lot of cool stuff

Talks: <a href="https://github.com/RobertASmith/talks">https://github.com/RobertASmith/talks</a>

Journal Publications: Google Scholar

CV: CV

Dark Peak Analytics: <a href="https://darkpeakanalytics.com/">https://darkpeakanalytics.com/</a>

Open Source Code: <a href="https://github.com/dark-peak-analytics">https://github.com/dark-peak-analytics</a>

#### Robert Smith

PUBLIC HEALTH, ECONOMICS & DECISION SCHENE
School of Health and Related Research (ScHARR), University of Sheffield
Word Goord, 1 Mappin St. Sheffield, St. 4DT, UK
St. publichlarkgrahambrins.com | St. Pobert-Shnith | St. robert-smith-5305438 | \$\frac{1}{2}\$ \$\pi \text{RDGetSmith}\$

As a built recommit with a budgerouth in epidemiology, data science, and statistical programming. It bring a surgue skill set to the field of public booths, My PiD and subsequent published rescued at the University of Sheffleld formed on the application of methods from economics and data science to improve public health noticenses. I ame colonised or Data Filos Andrikts Etd, a company specializing in the rank-word applications of need built recommends of the Filos Andrikts Etd, a company specializing in the rank-word applications of need built recommends. NGOs, that the contraction of the contra

#### Experience\_\_\_\_

#### Director Dark Peak Analytics

Sheffield, United Kingdom

Dark Peak Analytics provides expertise in leashle economics, statistics, data science and public health. We have perviously vector with the World Bodish Organization (on projects including a andiology, repordactive health, health services research and physical activity), non-governmental cognizations, physical productive health is serviced and physical activity), non-governmental training on data-science for health research. For more information on expertise and a list of publications we were darkneakanalytic com.

#### Principal Health Economist

Sheffield, United Kingdom Dec 2021 - Aug 2022

Assistant or Anapolis, assistant of Anapolis (previous) Brothfol) website, an pojects relating to Principal health connentia at Lamanin's (previous) Brothfol) website, an pojects relating to the use of relatingent for a Lamanin's problems in health economics. Ded the development internally using Gas for Health and improved upon health occomonic models in R-Shire for clients in the pharmaceutical infinitely and developed a novel method for collaboration between that coveres and consultancies, published in Welforms Open Research.

#### Lead Epidemiologist & Statistical Programmer

London, United Kingdom 12/2020-05/2022

Advanced Analytics, U.K. Hudiki Security Aprices, DISSC.
This incredibly high impect work indectation with an innumently talented and productive team in like layer to be the most significant of my career. I worked with teams across Whitehold including the Calistot Gible COVID-19 Tackfore, Number 10 Palley Unit, DISSC and DIR, and with counterparts across the devolved nations to help inform the UK government's response to the pandemic. The edge gene ma fastisetic finalful into low analytical work conducted at pace on

#### feed into decision making in government. Expert Advisor

Zurich, Switzerland

World Health Organization IEEE/T Expert Advisory Group

107/

Initiated and red a research perior the reviewing the methods used in the WHO Europe's Health
Economic Assessment Tool for walking and cycling. Identified a new approach to estimating
the monetary breastful for inversal operation applyand activity. Johnel He. Core Group as an
expert activities in November 2006 for worldwide tool development. Advisors: Sonds Kahlmeier, Thomas Gotschil.

#### Research Associate

Nottingham, United Kingdom

University of Nottingham Business School
Health economist primarily focused on health services research, in particular the GP Access
Scheme. Results of the evaluation were presented to NHS England and the House of Commons

Health Select Committee. Supervisor: Paul Windrum



### Internship

https://docs.google.com/document/d/1A JdIR7u4JcXewp\_Devt--bPra\_S6sKTsG XqT4jCxX\_g/edit?usp=sharing Title: 1-Month FTE Internship Opportunity for PhD Students and Early Career Researchers in Public Health Economic Modeling Data Science

Are you a PhD student or ECR looking to gain hands-on experience in public health economic modelling and data science? <u>Dark Peak Analytics</u> is offering a 1-month FTE internship opportunity with the potential for a longer-term, part-time role afterwards.

Our company specialises in building health economic models to address complex real-world problems, utilising flexible modelling methods that are either slow or impossible to run in Excel. Many of our projects involve building and deploying web-based user-interfaces to improve usability and broaden accessibility of economic models for decision-makers and key stakeholders. We are active in publishing in peer reviewed journals and in teaching organisations to develop health economic models in R and leverage integrated data-science pipelines. We offer tailored courses to academia, regulators, and pharmaceutical companies, including an extensive 36-week program to help transition towards script based economic modelling.

We have a broad range of clients including NGOs, pharmaceutical companies, government departments, charities, consulting firms and universities.

As an intern, you would:

- · Work closely with public health economists managing real-world projects
- . Develop your skills in health economic modelling, public health, and data science.
- . Gain exposure to cutting-edge software tools and best practices in the field
- · Contribute to the development of health economic models and user interfaces
- · Attend our training workshops and access our training materials
- · Expand your professional network
- . Get paid, commensurate with any client work undertaken during the internship.

#### Requirements:

- Strong programming skills in R and previous experience with GitHub.
- . PhD or MSc in a quantitative field, preferably health focused
- · Experience with or knowledge of health economic modelling methods
- · Excellent analytical and problem-solving skills
- Ability to work independently and collaborate effectively in a team environment

To apply, please send your CV, a brief cover letter explaining your interest in this internship, and any relevant work samples to rsmith@darkpeakanalytics.com. We encourage applications from all qualified candidates and look forward to discovering the next bright mind to join our team!

#### Courses

#### Health Economic Evaluation in R - Course Content

Thank you for your interest in <u>Dark Peak Analytics</u>' short course series on the use of R for health economic evaluation. Dark Peak Analytics specialises in the application of methods from data-science to health economics, in particular advocating for the use of script based health economic models. The following modules are typically delivered to small groups of 6-12 in sequence, or individually where required. Each course is tailored to the needs of the delegates, often including a combination of weekly half day taught sessions with a drop-in code-clinic on a separate day. A coursebook containing the modules is made available to participants online.

	Topic	N*	Description	*N = number of half day sessions.	
1	Introduction to 2		This session covers the basics of using R - this is useful to get new users up to speed prior to the rest of the course. We assume no prior knowledge of R, starting from scratch.		
2	Version Control	2	Using GitHub via the RStudio GU	It o manage projects, collaborate and standardise methods within your organisation.	
3	R project workflow	1		sics on how to organise a project in R including R Projects, s, data storage, effective commenting, documentation.	
4	Intermediate R	2		teration, writing functions, tidyverse, missing data, regression ata carpentry, and code optimization.	
5	Partitioned Survival Models	4	We assume some basic prior	R, from survival analysis through to economic models. Rhowledge of survival analysis, but no knowledge of R. Ng the open source 'hesim' package to run PSMs in R.	
6	State Transition Models	4	and introduction to v	one way sensitivity analysis, probabilistic sensitivity analysis, alue of information and optimal pricing analysis. on using the 'heemod' open-source package.	
7	Automated Reporting	4	in <u>Smith et al. 2022</u> , and the offi end of the course delegates will	conomic model development using RMarkdown, as described cer package for Word and Powerpoint presentations. By the have built a semi-automated (one click update) report for a nealth economic model in R.	
8	R shiny for Health Economics	4	stakeholders to run the model ren	b-based user-interface for a health economic model to allow notely. Largely following <u>Smith &amp; Schneider (2020</u> ). By the enc ve deployed a customised health economic model online.	
9	Advanced data visualisation in R	1	Using open source R packages to convey important messages using data-visualisation, included to: cost-effectiveness-planes, cost-effectiveness acceptability curves & optipricing analysis.		
10	Packages for cost-effectivenes s models	2	standardises project structure a	e to facilitate automated documentation and testing. This nd creates an easy way to share code. Based on a paper by ess) on packaging cost-effectiveness models.	

The lead tutors, <u>Dr. Robert Smith</u>, <u>Dr. Sarah Bates</u> and <u>Dr. Paul Schneider</u>, are experienced teachers, having led short course on the use of R for decision modelling and having published open-source peer reviewed tutorials and methods papers on the movement towards 'Living HTA' and web-based user-interfaces for health economic models (as recently cited in CHEERS). The trio are supported by <u>Wael Mohammed</u>, <u>Shangshang Gu</u>, <u>Yelsa Saigi</u> and <u>Kate</u> Hilves.

